

reserved for future use. There is no text in that rule other than the words "Reserved". While applicant wishes to address the Examiner's concerns, it is unclear to applicant what to do and it is believed that this part of the office action was inadvertently included.

Claims 1 and 2 are rejected as being indefinite under 35 U.S.C. section 112 2nd paragraph. With claim 1, the Examiner stated that because the off-centering of the trick mirror is set forth, additional definition or structure should be included for the w-axicon mirror, as well. It is also asserted that the phrase, "in such a manner" is indefinite. In addition, it is stated that the phrase, "a pair of cylindrical electrodes of different diameter disposed concentrically" is inconsistent with the specification. Finally, with regard to claim 2, it is asserted that the phrase, "substantially Gaussian distribution" is indefinite because the term "substantially" is not further defined.

Regarding the Examiner's contention that "substantially" as used in claim 2 is indefinite, applicant respectfully submits that the law allows the use of the term, "substantially," without further definition. A recent court case, Verve LLC v. Crane Cams Inc. (Fed. Cir. November, 2002) supports this position. A copy of that decision is attached.

Regarding the other two phrases in claim 1 that are troubling to the Examiner, it is difficult to understand this position. The "pair of cylindrical electrodes of different diameter disposed concentrically" are shown in FIG. 1 and

discussed on Page 2 of the specification. As for the other assertion about requiring structure or definition for the w-axicon mirror, applicant respectfully submits that it is not required to provide such structure or definition in the claims. The specification clearly supports this language and that is all that is required under U.S. practice.

Applicant has amended the claims with attention to the Examiner's concerns. With regard to the rejections of claims 3 and 5 where the Examiner asserts that the phrase "substantially Gaussian intensity distribution" without any definition renders the claim indefinite, applicant respectfully submits that the law allows the use of the term, "substantially" without further definition. See, for example, Verve LLC v. Crane Cams Inc. (Fed. Cir. November, 2002) (copy attached).

The Examiner provisionally rejects the claims under double patenting in view of the co-pending application 09/854,421. Applicant respectfully traverses the rejection, as it is believed the present application is patentably distinct from the co-pending application, and therefore double patenting should not apply.

The Examiner rejected claims 1 and 2 as being obvious over U.S. Pat. No. 5,661,746 to Sukhman et al. ("Sukhman") in view of U.S. Pat. No. 4,514,850 to Holmes et al. ("Holmes"). The Examiner asserts that Sukhman and Holmes teach the invention because, among other things, Sukhman discloses a free space slab laser with a pair of cylindrical electrodes (11, 12), and Holmes teaches the missing w-axicom mirror.

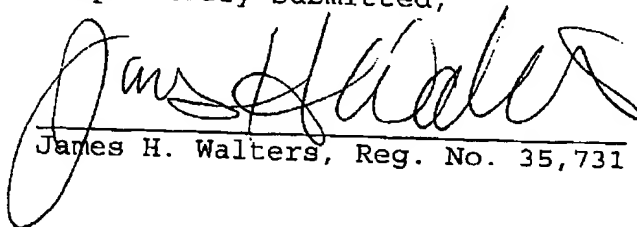
Applicant respectfully traverses the rejection.

Sukhman discloses a rectangular gas discharge slab with a rectangular cross-section. In addition, it uses T-shaped, not cylindrical shaped, electrodes that form the rectangularly shaped slab. Nowhere in Sukhman is applicant's cylindrically shaped electrode structure taught or even suggested. Second, the prima facie burden of showing that the combined references teach each element of the invention has not been met. Specifically, the art failed to show a ring-shaped trick mirror. Still further, there is no mention of a trick mirror positioned such that its offset,  $X_M$ , relative to the center position,  $X_0$ , is as follows:  $X_0 < X_M \leq 1.1X_0$ . Accordingly, it is respectfully submitted that the claims 1 and 2 are allowable.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references.

In light of the above noted amendments and remarks, this application is believed in condition for allowance and notice thereof is respectfully solicited. The Examiner is asked to contact applicant's attorney at 503-224-0115 if there are any questions.

Respectfully submitted,

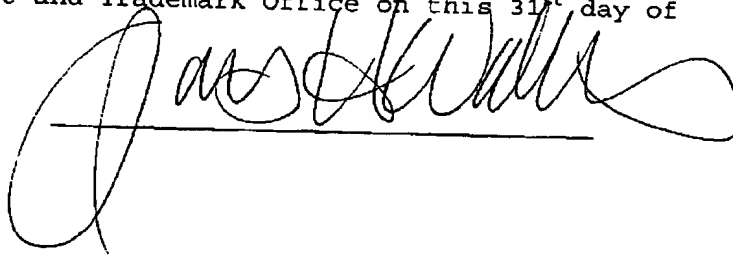


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MARKUP VERSION TO SHOW CHANGES MADE

In the Claims: 1. (Amended) A cylindrical straight slab type gas laser comprising:

a pair of cylindrical electrodes of different diameter disposed concentrically by way of spacers to fill the gap between the cylindrical electrodes with laser medium to define a straight slab;

a ring-shaped trick mirror disposed at one end of the straight slab;

an output mirror disposed at the center of the one end of the straight slab [in such a manner] to pass part of the light and to reflect a part of the remaining light; and

a w-axicon mirror disposed at the other end of the straight slab, characterized in that the relationship between the center offset  $X_m$  and the center position  $X_0$  of the trick mirror is set to  $X_0 < X_m \leq 1.1 X_0$ .

2. (Amended) A cylindrical straight slab type gas laser of claim 1, wherein the output laser beam from the output mirror has a substantially Gaussian distribution when it is focused by the lens.

**United States Court of Appeals for the Federal Circuit**

01-1417

VERVE, LLC,

Plaintiff-Appellant,

v.

CRANE CAMS, INC., CROWER CAMS & EQUIPMENT COMPANY, INC.,  
TREND PRODUCTS, INC., and COMPETITION CAMS, INC.,

Defendants-Appellees,

and

MANTON RACING PRODUCTS,

Defendant-Appellee.

John A. Artz, Artz & Artz, P.C., of Southfield, Michigan, argued for plaintiff-appellant. With him on the brief was John S. Artz, and Robert P. Renke.

Geoffrey R. Myers, Hall, Priddy, Myers & Vande Sande, of Potomac, Maryland, argued for defendants-appellees. Of counsel on the brief was James E. Wynne, Butzel Long, of Detroit, Michigan.

Appealed from: United States District Court for the Eastern District of Michigan

Judge Arthur J. Tarnow

# United States Court of Appeals for the Federal Circuit

01-1417

VERVE, LLC,

Plaintiff-Appellant,

v.

CRANE CAMS, INC., CROWER CAMS & EQUIPMENT COMPANY, INC.,  
TREND PRODUCTS, INC., and COMPETITION CAMS, INC.,

Defendants-Appellees,

v.

MANTON RACING PRODUCTS,

Defendant-Appellee.

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DECIDED: November 14, 2002

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Before NEWMAN, LOURIE, and CLEVINGER, Circuit Judges.

NEWMAN, Circuit Judge.

Verve, LLC, appeals the decision of the United States District Court for the Eastern District of Michigan,<sup>1</sup> granting summary judgment that claims 1, 6, and 13 of United States Patent No. 4,850,315 (the '315 patent) are invalid. We reverse the

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<sup>1</sup> Verve, LLC v. Crane Cams, Inc., 145 F. Supp.2d 862, 60 USPQ2d 1219 (E.D. Mich. 2001).

judgment with respect to anticipation, vacate with respect to indefiniteness, and remand for further proceedings.

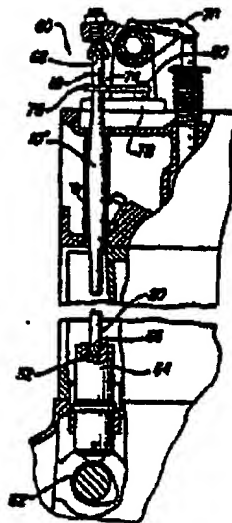
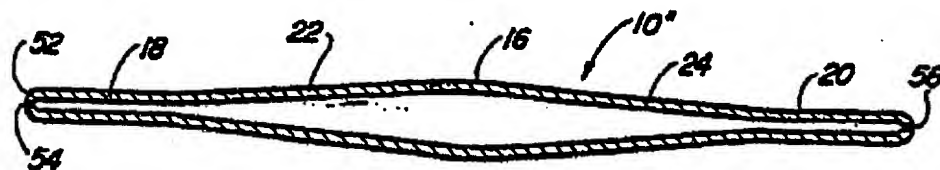
### BACKGROUND

The '315 patent describes and claims improved push rods for internal combustion engines. Push rods are used to actuate rocker arms which open and close the intake and exhaust valves of cylinders of engines designed for their use. In such engines the push rods ride on cam followers, which are raised and lowered by the camshaft as it rotates. As engine speeds have increased so have the number of piston strokes, requiring a corresponding increase in the number of valve openings and closings; this in turn increases the movement of and forces on the push rods. Stronger push rods became necessary and, to lighten their weight, hollow push rods were developed. However, there was a need for stronger and stiffer rods that could be manufactured from a single piece of metal without the need for inserts or other supporting structure.

The '315 patent claims a hollow push rod whose overall diameter is larger at the middle than at the ends and that has substantially constant wall thickness throughout the rod, and rounded seats at the tips. This novel shape is said to provide the advantages of increased strength and stiffness, permitting higher engine speeds and greater valve train



forces. The '315 patent illustrates the invention as follows:



As seen in the drawings and as required by the claims, the push rod 10 is configured whereby the outer diameter of the middle portion is larger than the outer diameter of the end portions 18 and 20. The end portions have a rounded tip 52 forming a seat, that engages a pocket of a cam follower at one end and a pocket of a rocker arm at the other end. The shape of the push rod provides increased strength, and because it is hollow it is relatively light. Since the rounded tips are integrally formed, there are no

problems with disengagement and the rod is relatively inexpensive to manufacture.

Claim 1 is representative:

1. A push rod for an internal combustion engine comprising:  
a single piece of metal in the form of an elongated hollow tube having a middle portion, first and second end portions and rounded seats at the tips thereof,  
said middle portion having a larger outer diameter than the end portions,  
and said tube having substantially constant wall thickness throughout the length of the tube and the tips thereon.

The district court granted summary judgment of invalidity on two grounds: that the claims are indefinite, and that the claimed invention is anticipated.

#### INDEFINITENESS

The district court found that the expression "substantially constant wall thickness" in the claims is not supported in the specification and prosecution history by a sufficiently clear definition of "substantially." The court explained:

In this case, judging by the intrinsic record, the meaning of "substantially" constant wall thickness is unclear. While not the basis of this court's decision, the ambiguity of this term was demonstrated at the motion hearing by the plaintiffs willingness to include great variations in wall thickness within the parameters of "substantially" constant wall thickness in a manner that renders them without meaning.

The court further explained that the word "substantially" was at issue because the parties disputed the scope of "substantially constant wall thickness," and that liability for infringement depends on whether "substantially" embraces the accused push rods. The court recognized that the usage "substantially" may be adequately definite in some cases, but ruled that in this case it was indefinite because it was not further defined. The court cited Amgen, Inc. v. Chugai Pharmaceutical Co., 927 F.2d 1200, 1218, 18 USPQ2d 1016, 1031 (Fed. Cir. 1991), for its statement that "When the meaning of claims is in doubt, especially when, as is the case here, there is close prior art, they are properly declared invalid."

We conclude that the court erred in law, in requiring that the intrinsic evidence of the specification and prosecution history is the sole source of meaning of words that are used in a technologic context. While reference to intrinsic evidence is primary in interpreting claims, the criterion is the meaning of words as they would be understood by persons in the field of the invention. Patent documents are written for persons familiar with the relevant field; the patentee is not required to include in the specification information readily understood by practitioners, lest every patent be required to be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for persons in the field. Thus resolution of any ambiguity arising from the claims and specification may be aided by extrinsic evidence of usage and meaning of a term in the context of the invention. The question is not whether the word "substantially" has a fixed meaning as applied to "constant wall thickness," but how the phrase would be understood by persons experienced in this field of mechanics, upon reading the patent documents. It may of course occur that persons experienced in a

technologic field will have divergent opinions as to the meaning of a term, particularly as narrow distinctions are drawn by the parties or warranted by the technology. Patent disputes often raise close questions requiring refinement of technical definitions in light of particular facts. The judge will then be obliged to decide between contending positions; a role familiar to judges. But the fact that the parties disagree about claim scope does not of itself render the claim invalid.

Expressions such as "substantially" are used in patent documents when warranted by the nature of the invention, in order to accommodate the minor variations that may be appropriate to secure the invention. Such usage may well satisfy the charge to "particularly point out and distinctly claim" the invention, 35 U.S.C. §112, and indeed may be necessary in order to provide the inventor with the benefit of his invention. In Andrew Corp. v. Gabriel Elecs. Inc., 847 F.2d 819, 821-22, 6 USPQ2d 2010, 2013 (Fed. Cir. 1988) the court explained that usages such as "substantially equal" and "closely approximate" may serve to describe the invention with precision appropriate to the technology and without intruding on the prior art. The court again explained in Ecolab Inc. v. Envirochem, Inc., 264 F.3d 1358, 1367, 60 USPQ2d 1173, 1179 (Fed. Cir. 2001) that "like the term 'about,' the term 'substantially' is a descriptive term commonly used in patent claims to 'avoid a strict numerical boundary to the specified parameter,'" quoting Pall Corp. v. Micron Separations, Inc., 66 F.3d 1211, 1217, 36 USPQ2d 1225, 1229 (Fed. Cir. 1995).

It is well established that when the term "substantially" serves reasonably to describe the subject matter so that its scope would be understood by persons in the field of the invention, and to distinguish the claimed subject matter from the prior art, it is

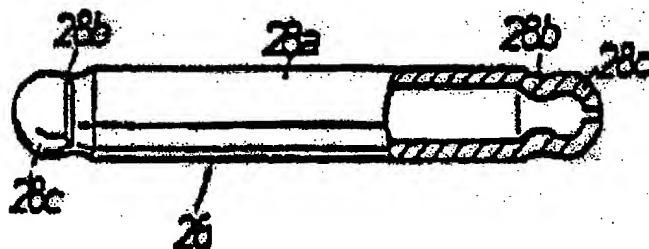
not indefinite. Understanding of this scope may be derived from extrinsic evidence without rendering the claim invalid. The summary judgment record offered no basis for departing from these general rules. Thus the usage "substantially constant wall thickness" does not of itself render the claims of the '315 patent indefinite. The summary judgment on this ground is vacated; we remand for further proceedings, including any appropriate recourse to extrinsic evidence concerning the usage and understanding of the term "substantially" in relevant context.

#### ANTICIPATION

Invalidity based on "anticipation" requires that the invention is not in fact new. See, e.g., Hoover Group, Inc. v. Custom Metalcraft, Inc., 66 F.3d 299, 302, 36 USPQ2d 1101, 1103 (Fed. Cir. 1995) ("lack of novelty (often called 'anticipation') requires that the same invention, including each element and limitation of the claims, was known or used by others before it was invented by the patentee"). A single reference must describe the claimed invention with sufficient precision and detail to establish that the subject matter existed in the prior art. See, e.g., In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990) ("the reference must describe the applicant's claimed invention sufficiently to have placed a person of ordinary skill in the field of the invention in possession of it").

The district court also held on summary judgment that the '315 invention was invalid for anticipation, based on the push rods shown in two Japanese patents designated JP 635 and JP 808. The Japanese patents show push rods that are hollow tubes with spherical

shaped ends, as follows:



Verve stresses that the Japanese push rods are not wider at their mid-portion like the '315 rods, but are of uniform diameter along their length. The drawings in the Japanese patents and the '315 patent reflect this distinguishing difference. Although the defendants argue that the ball shape at the end of the Japanese rods is of narrower diameter than the rest of the rod and thus that the Japanese end portion is narrower than the middle portion, the invention as described and claimed in the '315 patent does not encompass a tube of uniform diameter along its length, whatever the diameter at the rounded tip.

The Japanese patents on their face do not show the push rods of the '315 patent. No question of material fact is present, for neither the structures, nor their differences, is disputed. On the undisputed facts, no reasonable trier of fact could find the '315 invention anticipated by these Japanese references. Summary judgment of invalidity on the ground of anticipation is reversed.

## CONCLUSION

The summary judgment of invalidity insofar as based on anticipation is reversed. The judgment of invalidity insofar as based on indefiniteness is vacated. No other issues were decided by the district court. The case is remanded for further proceedings.

REVERSED IN PART, VACATED IN PART, AND REMANDED

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